

Rapid decrease of serum cholesterol concentration and postpartum depression

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On the basis of studies of pharmacological reduction of serum lipid concentrations, it has been suggested that reduction in serum cholesterol and triglyceride is associated with occurrence of depressive symptoms, suicides, and violent deaths.¹⁻³ Pregnancy induces a physiological rise in both serum cholesterol and triglyceride concentrations, with peak concentrations at term and a rapid decrease within a few days after delivery. Maternity blues is a common complication of the puerperium independent of obstetric variables.⁴ We postulated that the sudden fall in blood lipids after delivery could serve as a "natural" model to test the suggested association between serum lipids and mood.

Patients, methods, and results

We studied 20 healthy primiparous women (mean age 25.3, SD 3.7, range 19-34 years) without substantial marital, health, or socioeconomic problems and without a history of psychiatric disorders who registered consecutively for obstetric care. We excluded women with metabolic disorders, gestosis, or fetal complications.

Patients were interviewed by a psychiatrist with a structured clinical interview based on the *Diagnostic and Statistical Manual of Mental Disorders*, third edition. Serum concentrations of total cholesterol, lipoprotein subclasses, triglycerides, plasma glucose, progesterone, and other common biochemicals were measured after overnight fasting at two weeks before the expected delivery (day -14) and at the first and third days after delivery (days 1 and 3). Mood was assessed with the Zung self rating depression scale at day -14 and daily from the first to the fourth day after delivery (days 1-4). We calculated Pearson correlation coefficients between mood and absolute lipid concentrations and relative changes in serum lipids (from prepartum to postpartum values, expressed as a percentage of the initial concentration). The local hospital ethics committee approved the study, and each woman gave written consent.

Table 1 shows the women's serum lipid concentrations and mood scores. Absolute cholesterol concentrations showed no significant correlation with mood scores. Relative decrease in serum cholesterol was significantly correlated with mood scores. Uncorrected

correlation coefficients for the decrease in cholesterol from day -14 to day 1 and mood scores were -0.30 ($P = 0.47$) on day 1, -0.73 ($P = 0.02$) on day 2, -0.73 ($P = 0.02$) on day 3, and -0.68 ($P = 0.03$) on day 4. Accordingly, the decrease in cholesterol from day -14 to day 3 was highly correlated to mood scores on day 2 ($r = -0.75$, $P = 0.01$), day 3 ($r = -0.74$, $P = 0.01$), and day 4 ($r = -0.63$, $P = 0.05$). These associations remained after adjustment for progesterone concentrations. Partial correlation coefficients (r values) without progesterone for decrease in cholesterol from day -14 to day 1 were -0.28 ($P = 0.55$) on day 1, -0.73 ($P = 0.03$) on day 2, -0.74 ($P = 0.02$) on day 3, and -0.68 ($P = 0.04$) on day 4. The corresponding r values for decrease in cholesterol from day -14 to day 3 were -0.56 ($P = 0.19$), -0.75 ($P = 0.02$), -0.74 ($P = 0.02$), and -0.63 ($P = 0.07$) respectively.

Triglyceride and progesterone concentrations (absolute values and relative decrease after delivery) were not significantly correlated to mood scores (details available from authors).

Comment

Several studies have found an association between serum cholesterol concentrations and behaviour and mood.^{2,3} However, the described effects could also have been due to the lipid lowering drugs that were used in the studies and not to the cholesterol concentrations per se, as there is no experimental evidence for behavioural effects of cholesterol in humans.² Nevertheless, dietary lowering of cholesterol in monkeys led to a significant increase in aggressive behaviour.⁵

Our study is the first to use a physiological model of decreasing cholesterol concentration in humans to test its association with mood. We found a significant correlation between decrease in cholesterol and depressive symptoms postpartum that remained even after adjustment for progesterone concentration. Our results must be considered with caution because of the small sample size and short observation period, but this approach might be valuable in similar studies.

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Table 1—Data obtained from 20 primiparous women two weeks before expected delivery (Day -14) and for the first four days after delivery (days 1-4). Values are means (SD)(range)

	Day -14	Day 1	Day 2	Day 3	Day 4
Serum concentrations:					
Total cholesterol (mmol/l)	6.52 (1.19) (5.02-9.13)	5.40 (0.88) (3.72-9.83)***	ND	5.92 (1.58) (3.72-10.91)*	ND
Low density lipoprotein cholesterol (mmol/l)	4.11 (1.14) (0.03-6.65)	3.28 (0.80) (2.12-4.40)***	ND	3.52 (1.24) (2.17-7.53)*	ND
High density lipoprotein cholesterol (mmol/l)	1.50 (0.26) (1.11-1.99)	1.29 (0.28) (0.83-1.81)***	ND	1.34 (0.31) (0.91-1.86)*	ND
Triglycerides (mmol/l)	2.96 (0.78) (2.03-5.01)	2.35 (0.98) (1.30-4.64)***	ND	2.27 (0.79) (1.22-3.65)***	ND
Progesterone (nmol/l)	614 (417) (194-1367)	54 (35) (16-102)***	ND	32 (19) (10-57)***	ND
Mood score†	33.8 (7.3) (28-52)	33.6 (8.0) (22-44)	32.1 (7.6) (21-45)	30.0 (7.3) (20-43)	29.7 (7.9) (20-52)

ND = not done.

* $P < 0.05$, *** $P < 0.001$ compared with prepartum values.

†Measured with Zung self rating depression scale.

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